

Physics

Physics is the study of matter and energy, and their interactions in the areas of mechanics, heat, sound, optics, electricity, magnetism, radiation, and the atomic and sub-atomic world. Physics provides students with concepts and models for describing, understanding, and predicting many characteristics and phenomena of physical and biological systems. As such, it provides the foundation for many other sciences such as chemistry, astronomy, biology, geology, engineering, and medicine.

A minor in Physics is an appropriate choice for students pursuing majors in Environmental Science and Human Biology. It is also a good choice for students who plan to teach at the secondary level because there is a chronic shortage of qualified physics teachers.

Students seeking information on teacher certification should contact the Education Office.

- Physics Minor (<http://catalog.uwgb.edu/archive/2019-2020/undergraduate/programs/physics/minor>)

Faculty

Heidi S Fencl; Professor; Ph.D., The Ohio State University

Michael Hencheck; Associate Professor; Ph.D., The Ohio State University, Chair

Brian Welsch; Assistant Professor; Ph.D., Montana State University

Courses

PHYSICS 103. Fundamentals of Physics I. 5 Credits.

A non-calculus physics sequence covering fundamentals of mechanics, energy, power, thermodynamics and sound. Applications to the areas of biology, chemistry, the earth science and technology. During Fall semesters, this is a blended, or hybrid, course. It includes both online and face-to-face components. Full credit will not be granted for both PHYSICS 103 and PHYSICS 201.

P: Math 104 with at least a C grade or WPT-MFND score >465 and WPT-AALG score >525 and WPT-TAG score >525

Fall and Spring.

PHYSICS 104. Fundamentals of Physics II. 5 Credits.

A non-calculus physics sequence covering fundamentals of electricity and magnetism, electronics, light, atomic and nuclear structure and relativity. Applications to the areas of biology, chemistry, the earth science and technology. During Spring semesters, this is a blended, or hybrid, course. It includes both online and face-to-face components. Full credit will not be granted for both PHYSICS 104 and PHYSICS 202.

P: Physics 103 with at least a C grade.

Fall and Spring.

PHYSICS 141. Astronomy. 3 Credits.

A study of the solar system, stars, galaxies and universe.

Fall and Spring.

PHYSICS 142. Observational Astronomy. 1 Credit.

Observation of solar system, galactic and extra-galactic objects, and introduction to basic observational techniques in astronomy. Includes telescopic and unaided eye observation, positional astronomy, astro-photography, optic spectroscopy, interpretation of astronomical data, and astronomy laboratory exercises.

PHYSICS 143. The Solar System. 3 Credits.

Contemporary understanding of the Solar System; the sky and celestial motions; ancient astronomy; the Copernican revolution; light, gravity, orbits, and astronomical instruments; formation of the solar system; sun, planets and moons; asteroids, comets, meteors and meteorites; and the origin of life. May be offered for three credits without laboratory work or for four credits with laboratory work consisting of telescopic observation, laboratory demonstration and/or astronomy exercises.

PHYSICS 144. Stars, Galaxies and the Universe. 3 Credits.

Contemporary understanding of stellar systems: historical development; light, gravity, atoms and nuclei; astronomical instruments; properties and life cycles of the Sun and stars; black holes; the Milky Way and other galaxies; cosmology. May be offered for three credits without laboratory work or for four credits with laboratory work consisting of telescopic observation, laboratory demonstration and/or astronomy exercises.

PHYSICS 180. Concepts of Physics. 3 Credits.

Survey of physics, including motion, forces, momentum, energy, solids, liquids, gases, sound, heat, electricity, magnetism, light, atomic and nuclear physics. Designed for non science majors. Full credit will not be granted for both Physics 180 and 103, 104, 201 or 202.

Fall Only.

PHYSICS 181. Concepts of Physics Laboratory. 1 Credit.

Laboratory course to accompany Physics 180. Full credit will not be granted for both Physics 181 and 103, 104, 201 or 202.

P: Physics 180 or conc enr.

Fall Only.

PHYSICS 198. First Year Seminar. 3 Credits.

First Year Seminar, topics vary.
Reserved for New Incoming Freshman.

PHYSICS 201. Principles of Physics I. 5 Credits.

A calculus physics sequence for students of science and engineering. Includes fundamentals of mechanics, Newton's laws, momentum, energy, fluid statics and dynamics; temperature, heat transfer, thermodynamics; vibrations, waves and sound; electric forces and fields, DC and AC circuits, magnetism; atomic structure, semiconductors; electromagnetic waves, light; relativity, quantum mechanics, nuclear physics and elementary particles.
P: Math 202 with at least a C grade.
Fall Only.

PHYSICS 202. Principles of Physics II. 5 Credits.

A calculus physics sequence for students of science and engineering. Includes fundamentals of mechanics, Newton's laws, momentum, energy, fluid statics and dynamics; temperature, heat transfer, thermodynamics; vibrations, waves and sound; electric forces and fields, DC and AC circuits, magnetism; atomic structure, semiconductors; electromagnetic waves, light; relativity, quantum mechanics, nuclear physics and elementary particles.
P: Physics 201 with at least a C grade and Math 203 with at least a C grade.
Spring.

PHYSICS 310. Modern Physics. 3 Credits.

Modern physics has opened the door to exciting areas of exploration: very fast, very small, and very large. This course first examines the fast and small (relativity and elementary particle physics) then applies them to the large scale field of cosmology.
P: MATH 202
Spring Even.

PHYSICS 404. Electricity and Magnetism. 3 Credits.

An advanced approach to electrical and magnetic phenomena; waveguides, electrical energy generation and transmission, Maxwell's equations and electromagnetic waves, electric and magnetic properties of matter.
P: Physics 202 with at least a C grade and Math 209 with at least a C grade.
Fall Even.

PHYSICS 415. Solar and Alternate Energy Systems. 3 Credits.

Study of alternate energy systems which may be the important energy sources in the future, such as solar, wind, biomass, fusion, ocean thermal, fuel cells and magneto hydrodynamics.
P: Physics 104 with at least a C grade or 202 with at least a C grade.
Spring Even.

PHYSICS 417. Nuclear Physics and Radiochemistry. 3 Credits.

Properties and reactions of atomic nuclei; application of the properties of radioactive nuclei to the solution of chemical, physical, biological and environmental problems.
P: Chem 212 and 214 with at least a C grade and Physics 202 with at least a C grade: REC: Chem 321.
Fall Odd.

PHYSICS 420. Advanced Physics Laboratory. 1 Credit.

Upper-level experiments in Nuclear Physics, Optics and the experimental determination of fundamental physical constants.
P: Math 203 with at least a C grade, Physics 310 with at least a C grade.
Fall Odd.

PHYSICS 497. Internship. 1-12 Credits.

Supervised practical experience in an organization or activity appropriate to a student's career and educational interests. Internships are supervised by faculty members and require periodic student/faculty meetings.
P: jr st.
Fall and Spring.

PHYSICS 498. Independent Study. 1-4 Credits.

Independent study is offered on an individual basis at the student's request and consists of a program of learning activities planned in consultation with a faculty member. A student wishing to study or conduct research in an area not represented in available scheduled courses should develop a preliminary proposal and seek the sponsorship of a faculty member. The student's advisor can direct him or her to instructors with appropriate interests. A written report or equivalent is required for evaluation, and a short title describing the program must be sent early in the semester to the registrar for entry on the student's transcript.
P: fr or so st with cum gpa > or = 2.50; or jr or sr st with cum gpa > or = 2.00.
Fall and Spring.